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Pathways

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Joys and Explosions—Teachers Vs. Children

PART II

Jose Paul
Radhika Srinivas

..... When we look into the classroom, we find lots of opportunities where the teachers and the children can experience joyful as well as 'tension-filled' situations. During the O.M.E.P. workshop, about which we mentioned in our last issue, and, a few other teacher meetings we had here, an attempt was made to list out some of the common situations and look for appropriate responses. These responses are not a straight-jacket approach, and we will be able to find innumerable strategies of responding, to enable every child's fullest growth.

Our attempt here is to give some of the possible avenues for a few situations/events. Moreover, since we noted that the correction of a behaviour is found to be more difficult, and commonly practiced among teachers, we decided to start with the strategies needed for that purpose.

The first situation that we have taken is "TALKING IN THE CLASS" while, some important lesson/activity is in process. Some children, for various reasons, also, "DO NOT TALK" in the class and are timid to answer questions, which is again a hindrance for a child's fullest growth. Therefore, this situation has also to be handled in the classroom very discreetly.

TALKING BY ITSELF IS NOT AN UNDESIRABLE BEHAVIOUR!!!!!! Children are supposed to talk, because it is essential for their language development and communication skills! In fact, we teachers are supposed to encourage talking—conversation, because the one who talks the most learns the most!!! But, the WHEN, WHERE, WHAT AND HOW, of the conversation can be guided by the teacher. It is rather ironical that in the name of discipline we want children to keep quiet, to keep their finger in the lips, etc., even while they are in the playground, corridors, or when the teacher is not present in the classroom and while no teaching is going on!!! Here, it is not the talking that needs to be curbed, but the noise level that needs to be checked for the concern of the others.

Nevertheless, in spite of all this, in a classroom while a lesson is on, the teacher needs the attention of ALL the children.

When a child is talking while the lesson/ activity is in progress, distracting himself and/or others, it could be due to MANY REASONS, because any covert/overt behaviour has multiple causes to it. (fig. 1)

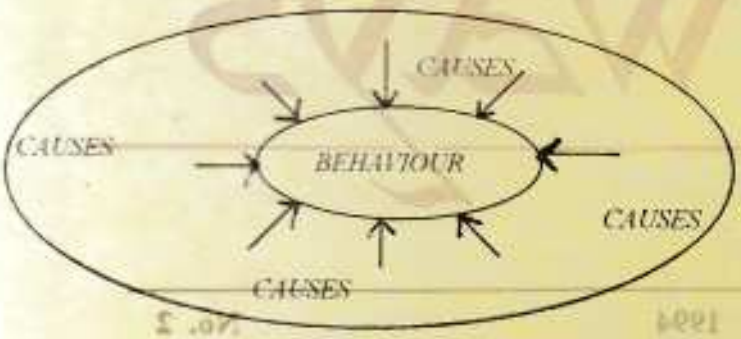


fig. 1

Thus in a distractive talking behaviour the causes could be any one or a combination of the following:—

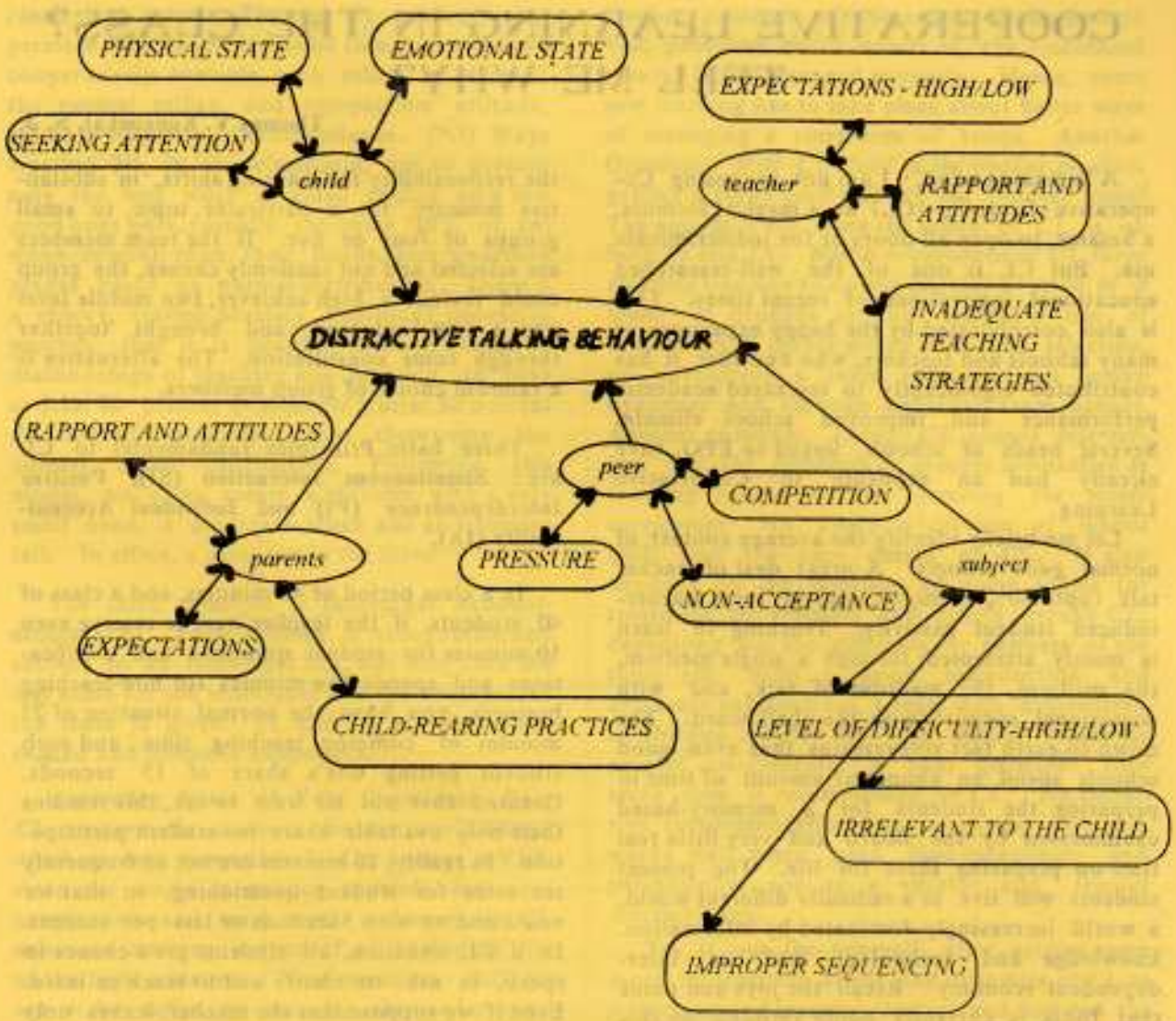
* The teaching methodology may not be attractive to the child.
* The content matter may not be interesting
* The child may have other concerns in his mind.
* An inadequate rapport may be shared by the teacher with the group ..... etc. .....

If talking in the class is a casual behaviour with the child, it would be better if the teacher ignored it, so long as it does not disturb the class ... However, if the talking in the class is forming a habit, then the child has to be corrected.

In both the cases, the teacher has to reflect on the above mentioned causes (fig. 2). Most probably a change in teaching strategy may result in attentive behaviour. However, the teacher must keep in mind that her objective is not to curb a child from talking, but to direct his attention to what is going on in the class.

In case, correction is needed, instead of using negative approaches such as name-calling, labelling, shouting at a child, or threatening, the teacher could use some of the following suggestions:—

1. Stop the session for a while—wait and watch till silence prevails. Then carry on.
2. Continue the session, by building up an eye-contact with the child.
3. Stop the session and state to the class—"I need your full attention to carry on".
4. When the majority of the class is attending the session, barring 1/2 children who are talking, the teacher may genuinely state to the class—"It is interesting to know that most of you are very attentive". This could bring about a change in those children who are involved in private talks.
5. If a particular child needs to be corrected, it could be done with sincerity and love, instead of using angry outbursts. The following type of positive directions could be given:—
   a) "Rahul, I need your help for the whole class to follow this session". (In a positive tone of voice and concern).
   b) "Rahul, we will all be happy to hear what you are sharing with Raju if it is not very private". (In a positive tone of voice and smile).
   c) "Rahul, I want you to attend this session, very carefully; it is important for you". (In an assertive not aggressive, confident and concerned tone of voice not authoriative).
   d) "Rahul, you seem to get distracted in that place, would you like to sit somewhere else, where you could attend to the lesson without distraction". (Again in a concerned tone of voice. The teacher here has given a choice to the child, and hence she needs to respect the childs' choice!)
   e) "Rahul, I know this topic is difficult/ boring/not interesting to you, but we



(fig. 2)

have to go through it together, so I need you with me". (In a positive and concerned tone of voice).

6. There is a natural tendency to "switch off" from a long "lecture" session. If the teacher is not able to change the strategy due to too much of information to be given, the teacher could state:— "Rahul, I know you find if difficult to attend a long lecture, but I want you to know, that I cannot always use other approaches, when I have too much of information to be provided to you. At such times I need your whole hearted cooperation".
7. Instead of trying to find fault with a child who is talking, the teacher could ask some relevant questions regarding the topic that is being taught and help the child, even by prompting, to answer, and appreciate the child for the answer.
8. The teacher could ask the child to share something which he knows related to the

(Contd. on page 22)

COOPERATIVE LEARNING IN THE CLASS? TELL ME WHY?

Thomas V. Kunnumkal, S. J.

A beginning word. I am not proposing Cooperative Learning (CL) as a magical formula, a Sesame, to open all doors or for indiscriminate use. But CL is one of the well-researched educational innovations of recent times. This is also corroborated by the happy experience of many schools and teachers, who find that it has contributed significantly to increased academic performance and improved school climate. Several heads of schools, linked to EPG, have already had an exposure to Cooperative Learning.

Let me briefly identify the average context of normal *good* schools A great deal of teacher talk (upto 80% or more), and in turn, teacher-induced student passivity. Teaching to learn is mainly attempted through a single medium, the medium, the medium of talk, and with occassional support with the chalkboard. The down-to-earth fact still remains that even good schools spend an abnormal amount of time in preparing the students for a memory-based examination by the Board and very little real time on preparing them for life. The present students will live in a radically different world, a world increasingly dominated by information, knowledge and technology and an inter-dependent economy. Recall the joys and pains that India is currently going through on this front. In the world of tomorrow, students must be made capable of higher-level thinking skills, communication skills and social skills. Increased use of information and knowledge for work and production will mean that the economy and social processes will become more people-oriented The young will have to learn to deal with conflictual situations and learn more cooperative ways Apart from academic pay-offs, CL offers team-building and class-building gains as well. So,

What is Cooperative Learning?

It is an organized effort on the part of the teacher to provide learning structures, where the responsibility for learning shifts, in substantive measure, for a particular topic, to small groups of four or five. If the team members are selected and not randomly chosen, the group could include a high achiever, two middle level and a low achiever, and brought together through some consultation. The alternative is a random choice of group members.

Three basic Principles fundamental to CL are : **Simultaneous Interaction (SI); Positive Interdependence (PI) and Individual Accountability (IA).**

In a class period of 40 minutes, and a class of 40 students, if the teacher were to reserve even 10 minutes for student questions and clarifications and spends five minutes for non-teaching business, you have the normal situation of 25 minutes of common teaching time and each student getting one's share of 15 seconds. Granted that not all want to ask, this remains their only available share for student participation. In reality, 10 minutes are not so frequently set aside for student questioning, so that we could end up with 5 seconds or less per student. In a CL situation, all students get a chance to speak, to ask to clarify and to teach or learn. Even if we suppose that the teacher leaves only 10 minutes for student participation, (in a CL structure, this time would be very much more), in their own group of four, each student would still get an average of 2.5 minutes instead of 15 seconds or less.

The second principle is Positive Interdependence: PI occurs when the gains of individuals or teams are positively co-related, when the gain of one student is associated with the gains of other students and in different measure contributed to, by team members. If the target set for the team is, that 80% of the topic should be mastered by each team member by scoring 80% at least, each team member will work hard to

reach that target. Through PI, students experience "being on the same side," and behave cooperatively towards each other, in place of the normal selfish and competitive attitude, which is Negative Interdependenee. (NI) Ways creating NI, in the classroom, are to present only the best work in class, calling on a few good ones only, (usually the same 10% or so) when several raise their hands, and awarding grades based on normal distribution. There is a theory, (called Mastery Learning), proved in practice, that it is possible, through change of methodology of teaching and learning, to have at least 80 percent of students master 80 percent at least of the subject, thus disproving the normal curve distribution. Following this model, we often create a monster, with a very small head, a moderate trunk and an immense tail. In effect, a dinosaur in the class!

The third principle is Individual Accountability (IA). Each student is accountable and subject to an individual test, and only then the test score for the individual and the average for the team is given. PI and IA are closely co-related and mutually supportive.

Answering Some of Your Questions: *Does CL prepare the students for the world ahead, which is very competitive?* The answer is YES, since the world is moving towards increased cooperation and team work and secondly, CL enhances learning output of all, including that of the high achievers. Next question: *Will the top order suffer, by tutoring the weaker ones?* The answer is No, since teaching definitely improves learning appreciably. *Will not CL produce problems of classroom management?* Yes, problems could occur, if the increased synergy is not managed properly. Henee, some new learning has to take place about better ways of managing a classroom of teams. Another Question: *Will CL lead to the weaker students getting a piggy back ride on the smarter ones?* The answer is No. since the accent of CL is on both PI and IA. *Will a programme of CL force students who don't like one another to work in a team?* It depends on the teacher's use of sociometry or others means of careful selection, on developing a team spirit through group dynamics and through enhanced team output. Another question: *Though CL sounds interesting, will the emphasis on process orientation in learning take a toll on covering the whole curriculnm?* No. There is division of labour built into the very design of CL. It also depends on the selection of some topics for treatment by teachers and others through CL, depedinng on the difficulty or newness of the topic etc. With a good introduction and nec:ssary explanations, a team with differentiated abilities can also deal with difficult topics or project assignments. A final question: *How much time is recommended for CL?* No definitive recommendation can be given, but CL works well when used discriminatingly and periodically, not as a routine and regular methodology.

Try it out for yourself, after getting some more information about the dynamics of CL as a teaching and learning strategy and find out the answers for yourself. Then share it, through *Pathways.*

Every team—Whether in work or in play situation—is like a family comprising husband, wife and children. As they say, the family is like a chariot where the husband and wife are its two wheels. If one wheel breaks down, the chariot overturns. If one wheel slows down, the chariot changes its direction & can even turn around to go back. If one wheel gets jammed, the chariot starts going around in a circle without advancing forward.

Even the horses pulling the chariot have to run at the same speed. That is what working together is all about..... Equality of Sacrifice .....to make things work.

from the : **MANAGMENT THOUGHTS**
Pramod Batra & Vijay Batra

The Amazing 10 x 10 Square

A 10×10 square with 10 cms in length and 10 cms in width is a versatile aid in teaching of mathematics at various levels. (fig. 1)

1. At early stages when children learn to write numbers upto ten, it can be used as a simple aid to write numbers upto 10 in each row.

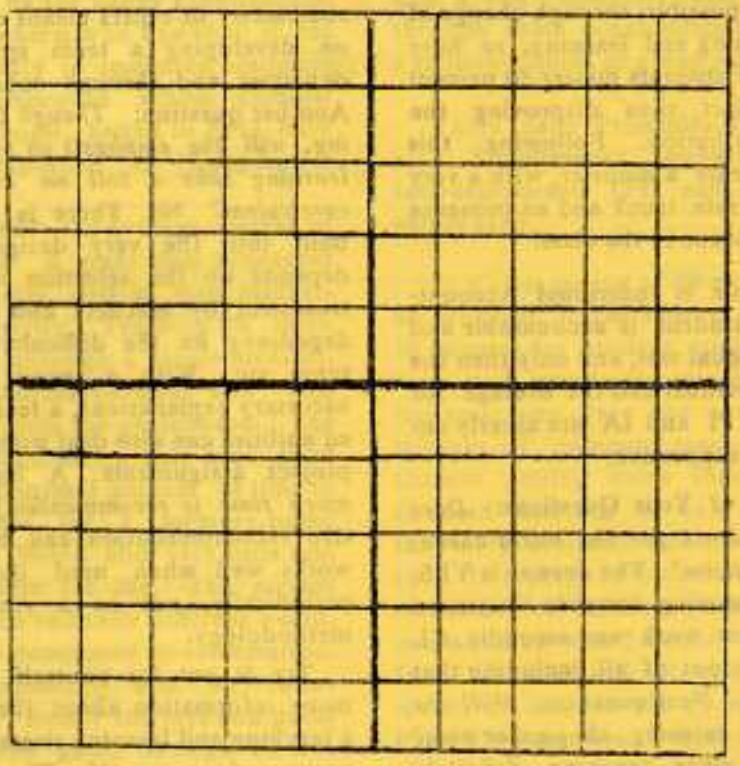


fig. 1

b) to write numbers in increasing order and decreasing order.

2. When children know to write numbers upto 20, it can be used.

a) to write numbers upto 20 in two rows

b) to write numbers backward from 20 to 1

c) to skip count in twos and write numbers upto 20

d) to skip count in threes and write numbers upto 20

e) to skip count in fours and write upto 20

f) to skip count in fives and write upto 20

g) to skip count and colour upto 20 to see the pattern

i) to use it as a number line for increasing order and decreasing order upto 10 and then further upto 20 showing it as a folded number line. This will lead on to increasing and decreasing order upto hundred.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

fig. 2

h) to determine 'greater than', 'less than', 'after', 'before', 'between' upto 10, and then upto 20 and further upto 100.

j) (i) additions of units by moving forward

(ii) subtraction of units by moving backwards

(iii) addition of tens by moving vertically downwards

(iv) subtraction of tens by moving vertically upwards

(v) addition of two digit numbers by moving vertically down for tens digit and horizontally forward for unit digits of the number to be added

(vi) subtraction of two digit numbers by moving vertically up for tens digit and horizontally backwards for units digits of the number to the subtraction

(vii) addition and subtraction of 11, 22, 33 etc. by moving along the left to right diagonal

(viii) addition of 9, 18, 27 etc by moving along the right to left diagonal (fig. 2)

k) To discover patterns of multiples of (say 2) by colouring the multiples of two in 10×10 numbers square. This can be repeated for multiples of various numbers.

l) To discover the common multiples. Colour (say multiples of 5) in a 10×10 number square. Now use another colour to fill the multiples of (say 6). Numbers such as 30, 60, 90 will be shaded in two colours—these are the common multiples of 5 and 6. This will lead the student to understand that 30 is the least common multiple (L.C.M.)

m) **Mark any 3×3 square anywhere in the 10×10 number square which is filled from 1 to 100. (fig. 3)**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

fig. 3

Explore

(i) **Sums of the columns and their differences**

(ii) Sums of the rows and their differences

(iii) Sums of diagonals and the middle columns and row

(iv) The averages of each row

(v) The averages of each column

(vi) The averages of all the rows, and so on .. ..

n) **The above may be repeated and explored for any 4×4 square, 5×5 square and so on in the 10×10 square.**

o) To draw regular and irregular figures, shapes using the grid squares. (fig. 1)

(i) to find areas by counting the squares

(ii) to find perimeters by counting the unit segments on the bountary

(iii) to discover shapes with same perimeter having different areas

(iv) to discover shapes with the same area having different perimeters

(v) to discover that different shapes may have the same area or perimeter

(vi) to discover formulae for perimeter of rectangles and squares

(vii) to discover formulae for area of a rectangle, square, triangle, trapezium etc.

p) To learn grid system using ordered pairs i.e. to mark points such as (2, 3), (7, 3), (8, 4) etc. by making the grid numbers. (fig. 4)

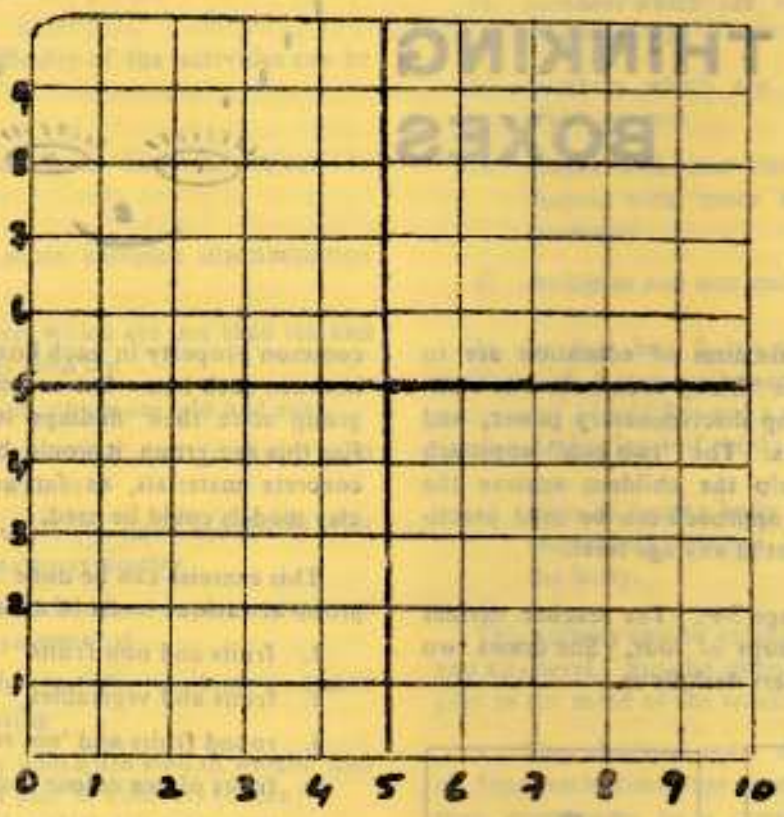


fig. 4

q) To draw line graph.

r) To draw bar graph.

s) To draw congruent figures.

t) To draw similar figures.

u) To draw symmetric figures (mirrot image).

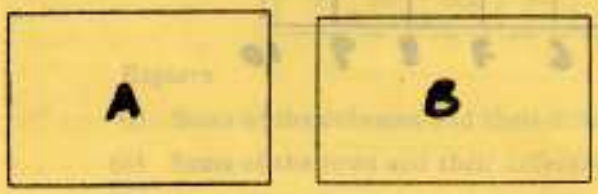
It is possible to use this grid for various other purposes. This article is meant only to give possibilities of use. One thing which stands out is that this grid can be used for various topics at different levels of difficulties in different class levels. Hence it is a good idea to keep large number of copies of this grid for use in various classes and allow the children and teachers to explore in order to make the children capable to thinking, exploring, creating and understanding various concepts in maths in a practical way.

With such imense possibilities of learning by using a simple number grid, is is not worth investing a little money and time :.....?

THE THINKING BOXES

Some of the main aims of education are to make the children think, enable them to communicate, to develop discriminatory power, and develop social skills. The "two box" approach is one way to help the children achieve the above goals. The approach can be used practically for any subject at any age level.

Let us start at age 5+. The teacher divides the class into groups of four. She draws two boxes on the teachers desk/floor.



She keeps one item (say an apple in Box A, a cucumber, in Box B). Then she puts one more item in each box, say (an orange, a lady's finger). Now ask the groups to discuss and make a guess to what makes one box different from the other. If a group has found out what the two boxes represent, ask them not to give out the answer but just state that "we know". Ask that group to put items in each box depending upon what they have found out. Let the other groups now discuss between them. The groups which found out will state "we know". These groups also will put one item each in both the boxes. This goes on till all the groups have stated "we know" and put one item each in each box. Now ask all the groups to discuss and define the classification in the common property in each box and the difference between each box. Let one member from each group state their findings to the whole class. For this age group, it would be preferable to use concrete materials, as far as possible, if not clay models could be used.

This exercise can be done for the same age group at various levels of difficulties.

1. fruits and non-fruits
2. fruits and vegetables
3. round fruits and 'not round' fruits
4. fruits of one colour and other colours
5. living and non living things
6. animals and birds
7. pets and wild animals
8. boys and girls
9. vegetable eaten row and those eaten after cooking
10. printed books and note books
11. magazines and newspapers
12. regular shapes and irregular shapes
13. triangles and other shapes
14. triangles and squares
15. squares and rectangles and so on ....

At the age 6+ the same activities may be done. This time instead of concrete materials and clay models, pictures of objects could be used. Instead of drawing two boxes, two flannel boards could be used or divide a flannel

broad into two parts by a ribbon or strip of paper. The pictures could be pasted with a flannel piece. The activity is the same as before.

The level of difficulty of the activities can be raised

1. transference from concrete objects to pictures.

2. taking up more complex discrimination such as

   a) numbers which are less than ten and greater then ten

   b) numbers which are odd and even

   c) numbers which end in 5 or 0 and other numbers

   d) shapes which have symmetry and not having symmetry

   e) alphabets which are symmetrical and non symmetrical

   f) vessels used for cooking and used for eating

   g) things which are sold in weight and things sold in numbers (dozen)

   h) bathing soaps and detergents

   i) carnivorous animals and herbivorous animals

   j) birds which cannot fly and the ones which fly

   k) animals which walk and animals which crawls

   l) animals which live in water and those that live on land

   m) nuclear and joint families

   n) types of food-vegetarian and non-vegetarian

   o) proteins and vitamins, and so on.....

At age 8+ the same activity can be used for finding more complex discrimination. At this stage just draw the boxes on the black board and write the items in words or a pictures.

   a) numbers which are multiples of 3 and which are not

   b) numbers which are multiples of 5 and which are not

   c) shapes with one line of symmetry and shapes with more than one line of symmetry

   d) multiples and non multiples, for e.g.

In the first box 9 is a multiple of 3, 20 is a multiple of 5, but in the second box 21 is not a multiple of 34 and 9 is not a multiple of 6. This needs a higher level of thinking to discriminate.

   e) parts of human body which are parts of respiratory systems and other parts of the body.

This activity can be extended to any subject and any level. But the important aspects to be kept in the mind of the teacher are:—

1. The children must discuss in the group of four each time one item is introduced and they must come to a consensus whether they agree on their findings. This will enable them to meaningfully communicate on the topic and build in them the social skills needed to be built up and also ability to communicate logically, and help them to clarify their thinking.

Use these boxes properly in the class to develop thinking and expression of ideas. The purpose of the groups is to define the characteristics of each box and the differences of the boxes will be an effective way of concept learning. The teacher must make sure that there is active participation of all students in the process of discussions.

While preparing any lesson in any subject at any level, the teacher will be able to find opportunities of using this approach. So, plunge into these thinking boxes!!!!!!

Towards A Better Society—Schools' Role

Outreach Programmes in Delhi Presentation Convent School

Presentation Convent School's new Principal, Sister Anice, presents a brief report on the many developmental activities, partieularly of the social sensitization of the girls, carrying forward the excellent tradition of the school. PCS has an outstanding academic record, very good in dance, music and speech and other curricular areas, making it a Total School. (Editor)

The Report:

We had a good tradition of our school going beyond its walls to the neighbourhood and through organized and regular programmes our solidarity with the less privileged sections of our society. Our PCS girls go marching to the neighbouring slum, **Sanjay Amar Colony**, which we have adopted and where we have been working for the past few years The previous Principal, Sister Gemma and the dynamic Seema (MSW) providing both leadership and organizational support, the students and teachers were involved in a variety of programmes in Sanjay Amar Colony.

The earlier programme of Literacy Campaign continues in PCS. We realize that with eradication of literacy, other tragedies also become less: infant morality, disease and economic deprivation. We are happy with our modest contribution of making 50 persons fully literate during this year. The learners are drawn from a cross section of society—personal drivers, cooks, gardeners, rag-pickers, etc.

One of the learners of Sanjay Amar colony, Rajesh got a scholarship of Rs. 250 from the National Literacy Mission. We also organized a rally by our students to make the people aware of the real dangers of the dreaded AIDS.

As part of social education and sensitization of students, the girls put up a play, "Nari Ka Sangarsh", which was the outcome of what the entire team thought, felt, wrote through a workshop and then staged.

Once a week, a group of our students from Classes XI visit the Shishu Bhawan (home for the abandoned babies) and Nirmal Hriday (the home for the destitute and dying), both run by the Missionaries of Charity, and help the inmates with a number of chores—talking to them and listening to them, reading out to them, writing letters for them, etc. During national festivals, the girls prepare a number of items (dance, recitals, drama etc,) and present these to their 'friends'. The girls are delighted to see happy smiles on the faces of these abandoned and anxious persons, both the young and the old. Our Class VIII students organized a cleanliness drive in September, making everyone conscious of the need to have our campus clean. A great deal of success was achieved.

Our students are being made aware of the "Religious Issue". The *Sampradayak Virodhi Andolan* group conducts lectures for Class XI students every Friday. Once a month, there is a group discussion where the various opinions of the students are put forth A group of our teachers are also active members of the *Ekta Movement Group*. Once a month, a Forum meeting is held in school Topics related to Religion, Art, Architecture, Indian Cinema and its impact on children have been discussed so far. The teachers then take these values for classroom discussions.

We hope that our many new ventures would gather momentum in the new year and build stronger bonds between our school community and the society around us.

N.B.:—We are glad to say that there are many other schools also which are involved in similar activities. As and when we get it, we will share them in the PATHWAYS.

AN EXTRAORDINARY AND INVISIBLE JOURNEY INTO THE BREATHING MILL

The human body is indeed a miraculous system, and an absolute ideal of cooperation, coordination and integration!! In this lesson on the human respiratory system, the students can get an unique opportunity to explore and understand the various parts of the respiratory system, the process of respiration and its collaborative efforts. The main objective of this lesson is to enable students to experience and understand the parts and functions of the human respiratory system.

Procedure : (Part 1)

1. The teacher, to begin with, will tell the class that they are all going to perform an imagination exercise, wherein, she will suggest a series of words. As they hear one word, their task would be to "tune on" that part in the brain, which will help them to see various images with their minds' eye, and also hear various sounds with their minds' ear. Whatever image they see and sounds they hear they'll share with their partners.

2. The teacher can begin the exercise by instructing as follows :—

"Close your eyes. Relax and listen to the word that I call out. As soon as you hear the word, see what "image/images" you see with your minds' eye and what "sound/sounds" you hear with your minds' ear (pause) Now, open your eyes and share your "image" and describe the "sound" with your partner".

Some of the works that she could read out are :—

clock machine heart swimming
wind picnic food a relative
party trees water yourself as a baby etc,

The teacher now tells the class, that they are going into another inother imagination exercise for which she instructs them as follows :—

"As in the earlier exercise you'll listen to a few words. Whatever "image" you see, you will sketch on the paper and the "sound" you hear, you'll describe it in words. Every one of you will be provided sheets of proper, colours and pencils. Now keep your things on the table, close your eyes. Take a few deep breaths. Relax and listen to the word-cup-. (Pause) (Pause)

Imagine as clearly as you can. Open your eyes sketch the image and describe the sound".

A few more words could be read out for them to get the feel of the exercise.

3. The teacher can ask them to share their sketches and descriptions in pairs, and also share about this imagination exercise.

Part 2

4. The teacher asks them to keep fresh blank sheets in front of them and tell them the following :—

"Close your eyes. Take a few deep breaths. Relax totally: now. I wouldlike you to imagine that you are in your kitchen at home. (Pause). Look around, and try to see as much as you can with your minds' eye. (Pause) Notice whar is being cooked on fire. Whats' mummy doing there? Whats' papa doing there? Do you see any specific tools being used lying around? (Pause) Listen carefully to the sounds you hear? Is there anything special that you are noticing hearing?

"Try and hear the sound that is made by the dish that is simmering on the fire (Pause).

Open yout eyes slowly. Now, on that paper draw whatever you saw with your minds' eye and describe in words about the sounds you noticed with your minds' ear, share your sketches and sounds with your earlier partner, also remember to share what you feel about this exercise.

5. The teacher can provide one more practice exercise, now, to an unfamiliar place-like, for e.g relaxing in their favourite garden park.

"Close your eyes Take a few deep breaths. Relax breathing deeply, now, imagine that you are in your favourite park. (Pause) Take a few moments to think of that place and then, imagine as clearly as you can, that you are there (Pause). Imagine tnat you are swaying in the light breeze. (Pause). As you are swaying, you find the leaves and coloured flowers also swaying with you. Imagine that the flowers are spreading their fragrance all around, as they are swaying (Pause). Enjoy and intermalise the fragrance for a while As you are swaying listen particularly to the sounds you hear. (Pause) Imagine now that you are suddenly becoming light, lighter and lighter and lo! you are floating. Be with that feeling of floating and try to see and hear as many things you can while floating. (Pause). New imagine that you continue to float higher and higher until you find yourself in the space Be with the space for sometime, getting a feel of what space is like. Notice the sounds you hear in space, when you feel ready allow yourself to float back and back and slowly back to your colourful breezy favourite park (Pausc)

Now, slowly open your eyes and sketch what you saw and experienced on your trip to your favourite park and to space on the sheet of paper, also particularly describe the sounds you noticed on your trip.

Share your sketches, and descriptions with your earlier partner Also share what you feel about this exercise".

The teacher must encourage sharing and discussions after every exercise.

Part 3

6. The teacher now tells the class, "we are today going to learn a biology lesson on the human respiratory breathing system We breathe all the times unconsciously, when we are awake and when we are asleep Do you know that behind this breathing which we never even think of, there is an entire FACTORY that is working. Today we are going to explore everything about this mechanism of breathing".

7. The class is now divided into groups of four. In the group, one member will be the facilitator who will equip the group with all the materials (reading materials pencils, rough sheets, colurs, rubber) that'll be needed for the session.

The 2nd member of the group will be the Reader and Reporter who will read the reading material to the group slowly and clearly, and after the whole exercise will report the group experiences to the class.

The 3rd member will be the clarifier/checker who will clarify doubts, and check to see if things are going on smoothly and also makes sure that every member has digested the reading material.

The 4th member will be the encourager—who will keep the group motivated throughout the session. Every member of the group will help one another to understand.

8. The teacher next instructs the reporters of the groups to read the reading material (see Appendix at the end of this lesson) provided to the group, very clearly, for all the members to understand.

9. The group will be allowed to discuss all about the reading material for a few minutes.

10. The teacher now invites the class to her attention, and tells them that they are again going to go on an extraordinary journey to visit this fascinating factory. The teacher asks them to get ready. (She could even ask them if they have seen any movie/heard any story about an invisible man.)

They are all now going to pretend to become invisible in order to make a trip to our respiratory system see images with our minds' eye and hear sounds with our minds' ear. She can ask them to think some of the things that are commonly seen in factories like, machines, workeres, water supply, power supply, etc. She now tells them that they are all going to imagine that our respiratory system is a factory that finally produces energy—energy for playiag, having fun, and living! They'll also be told that they will be experiencing breaks in their trips, when they will be told to come back, to reality, sketch the images and describe the sounds they hear, on a fresh sheet of paper, individually. So get ready for this fascinating trip and let your imagination run "wild" to enable you to see and hear as much as you can".

"Are you all ready? Then. . . .

Close your eyes. Take a few deep breaths. Breathe deeply and relax totally", when the teacher senses they are ready, she can lead them to the process, as described below:—

Pretend that you found a wierd seed, which when you swallowed gave you the power to become invisible and blend with the air around (Pause). Now you are invisible, not be seen by anyone, blended with the atmospheric air, which contains a lot of oxygen, (Pause). Imagine that you are floating. I will give you a few minutes to make yourself feel comfortable with your new state and be one with it (Pause).

You have now become a part of the air and you are able to flow like the air. As you are floating, you decide to begin your journey (Pause). You are gently floating and moving towards the place you want to visit; As you are approaching, you pass through two large open gates, which are called as the NOSTRILS. You have entered the gates and as you are floating you realise that it is dark inside, and some people are stopping you. Imagine you are being stopped, turned and checked, by a few guards. They are telling you—"Hey do not worry, it is the routine checking for dust and solid particles". Notice the final movements of the guards while checking. Imagine feeling comfortable with the guards (Pause). Do you notice any sound while being checked? Now the guards are gently swaying you to float ahead. Imagine that you are in a passage which is wet with mucus and slightly cool. This cool passage—NASAL PASSAGE—helps you to float further down and you come across a bend where you carefully float down to a box-like structure. As you enter, imagine, that you are fascinated to see a number of cords like in a violin. You move slowly stringing the cords. Listen to the vibrations caused by the cords. This box is the LARYNX (sound-box) which actually helps us to make various sounds. As far as the breathing is concerned this sound-box is simply acting as an air passage. Be with the larynx experiencing the sounds and vibrations (Pause).

Now, I would like you to break your trip come back slowly to the classroom (Pause), open your eyes and sketch your images und describe all the sounds you noticed. Did you notice any rhythm? Note down.

Close your eyes and relax, get back to your position in the larynx (Pause). Imagine you are now slowly beginning to float down a long. tunnel. You look around the narrow tunnel, and see a number of circular rings in it. These rings are cartileges that enable the air to move smoothly in any position you are in—like bending, lying down, stretching your neck muscles, etc., keeping the tube always open (Pause). You are now floating and swaying down the tunnel like one of those roller-coasters but this movement is not as frightening as the roller-coaster! This tunnel is called the TRACHEA. Imagine now you've almost reached the tunnels' end and you get a small bifurcation, that point is called the BRONCHUS. Pretend that you are confused where to go. Suddenly the trachea speaks out to you and says "do not worry both those paths lead you to similar destinations; go where you want to". Imagine feeling comfortable and swaying into a spongy, light-pink coloured bag. No, as you peep into

the bag—which is called the LUNGS, you see a lot of tiny branches and flower—shaped sacs. These tiny branches are called BRONCHIOLES. Imagine moving and floating from the bronchus to these bronchioles and into the flowers—oh! They are really air-sacs, also known as the ALVEOLI. These air-sacs play a very important role in the process of respiration here the exchange of gases take place. Imagine being in the lungs in the air-sacs for sometime. Get a sense of the space inside the lungs, notice any things special you see (Pause). Now from the air-sacs when you see look down you see an arch-like sheet-That is the DIAPHRAGM. Feel the diaphragm going down to accomodate the air inside the system. That's the reason why you find so much space in the lungs. Now, remember, you've not come to rest, you've to move. Imagine from here swaying and floating and being lead into very small passages and these small passages lead you to a cute, small soft bag—which is thumping—Dhak Dhak Dhak Yes, did you recognise that sound? Is it really Dhak Dhak or something else. Notice the sound (Pause). That cute little bag thumping away is the HEART, the important machine in this whole factory. Imagine yourself in the heart. (Pause) Notice that the heart actually takes in all the impure blood, purifies it and pumps out pure blood into all the cells of the body, which in turn produces energy to us! Remember, the heart is working 24 hours, doing this job, enjoying it, without any rest. Imagine clearly being in the heart, experience all the move ments there, notice and experience the sounds you hear there (Pause).

Now, slowly, come back to your class, open your eyes, and sketch all your images and describe all the sounds you experienced as vividly as you can." (Pause)

"Next, close your eyes, take a few deep breaths, relax, and slowly imagine becoming invisible and passing through those gates, those guards, that vibration in the larynx, the long, open, airy tunnel-trachea, the bronchus, the bronchioles, the air-sacs and the heart (Pause). Once in the heart, experience the movements for sometime, and now feel the flow of blood in and out of the heart (Pause) The air that has reached the heart mixes with the blood. The blood consists of carbohydrates, which when combines with the air liberates. CO_2, H_2O and energy—this energy is released in EVERY cell of our body. The CO_2 is not needed by the system, so the heart sends out the CO_2 through the same route the air entered in (Pause). Now imagine that you are the CO_2 that is being sent out, (Pause). Move your minds' eye from the heart to the vessels to the air-sacs, to the bronchioles, to the trachea, to the nasal passages —where the guards let you free out to the gate and lo! You are back in the air outside floating (Pause). Be with the feeling of floating for sometime (Pause).

Imagine quickly once again entering the nostrils, the hairy nasal passage to the bend where the larynx invites you with mild sounds, now you are swaying freely into the trachea, with the cartileges welcoming you, moving on into the air-sacs in the lungs (Pause). From the lungs, you are in the heart, and even before you know, this wonder-machine is pumping you out, cause you are now carrying CO_2. (Pause). Imagine moving out of the same passage with the diaphpragm reducing the space in the lungs pushing you out of the system through the air-sacs (Pause). Now you are in the air floating and swaying with the clouds (Pause). This whole experience you had in the trip, i e , being invited into the lungs with open arms—where the diaphragm goes down to accomodate you in the lungs—is inhalation. When you were in the heart, the diaphragm began pushing in the lungs, to make sure that the CO_2 that has been released after the reaction between the blood and the air does not have space in the system, and so you were out. This is known as exhalation (Pause). The whole process of taking in O_2 and releasing CO_2 is know as breathing respiration. (Pause).

Imagine now vividly of how beautifully and cooperatively the different parts work together to give us energy (Pause).

Slowly try and get back to the class. Now your trip has come to an end.

Think about what would happen if one part refuses/fails to cooperate. . . . (Pause).

Open your eyes. Relax.

Sketch your images. Describe your sounds.

Share all your images and sounds with the group.

Share all your experiences and feelings of this exercise with the group".

The Reporter notes down the groups' experiences, and feelings on a fresh sheet, exhibits it on the wall, and reports the findings of the group to the whole class.

Part 4

The teacher will now help the students to reflect on this imagination exercise, by asking a few questions, such as :

1. What did you feel about the exercise? Share your feelings with your group.
2. Was it helpful? How?
3. How was this excercise different from simply listening to the teacher and reading?
4. Could you repeat a similar excrcise in another topic?. etc.

Such reflecting questions could help the students to reinforce their understanding of the lesson and thereby help them to apply reflection as a technique of learning.

P.N : 1. The reading material is only a bare outline in order to bring out this methodology.

2. The instructions for the exercise must be slow & clear, allowing them to immerse in the imagination.

This methodology is only one of the many approaches for teaching. Many lessons however, could be adapted, depending on the lesson-like. for eg , in history, the students could be helped to go "back" and see what it was like "then"; or, in Mathematics, they could be helped to estimate measurments by sight and touch: or, in Art and Craft, helping them to pretend they can enter a painting and imagine what it is like; etc.,..., and the maturity of the group.

APPENDIX (READING) MATERIAL

In our everyday living, one of the actions thar we give very little importance to, is our BREATHING!! However, it is this involuntary action that gives us abundant energy to live. Thus, let us now see how this takes place . . .

We all know that we *ishale* in oxygen and *exhale* out carbon-di-oxide. This entire process of INHALATION AND EXHALATION IS referred to as *RESPIRATION*. Although it sounds so simple this mechanism is not really so.

The air passage (inhalation) is shown in Fig. a, in the form of straight arrows⟶ Note the parts thut it passes through) The exhalation is shown in Fig. a. in the form of dotted arrows - - -> Note the parts it passes through.

The diaphragm plays a very important role in the entire process of inhalation and exhalation.

We inhale air from the atmosphere through our nostrils From here, it passes through a mucus lining which contains small hair. These hair filter and comb out solid particles. This filtered air passes through the nasal cavity, the pharynx and the larynx into the trachea. The trachea is a long tube which is circled by cartileges. These enable the trachea to remain open against all sorts of pressures, thus making a smooth passage for the air to move into the

Fig. a

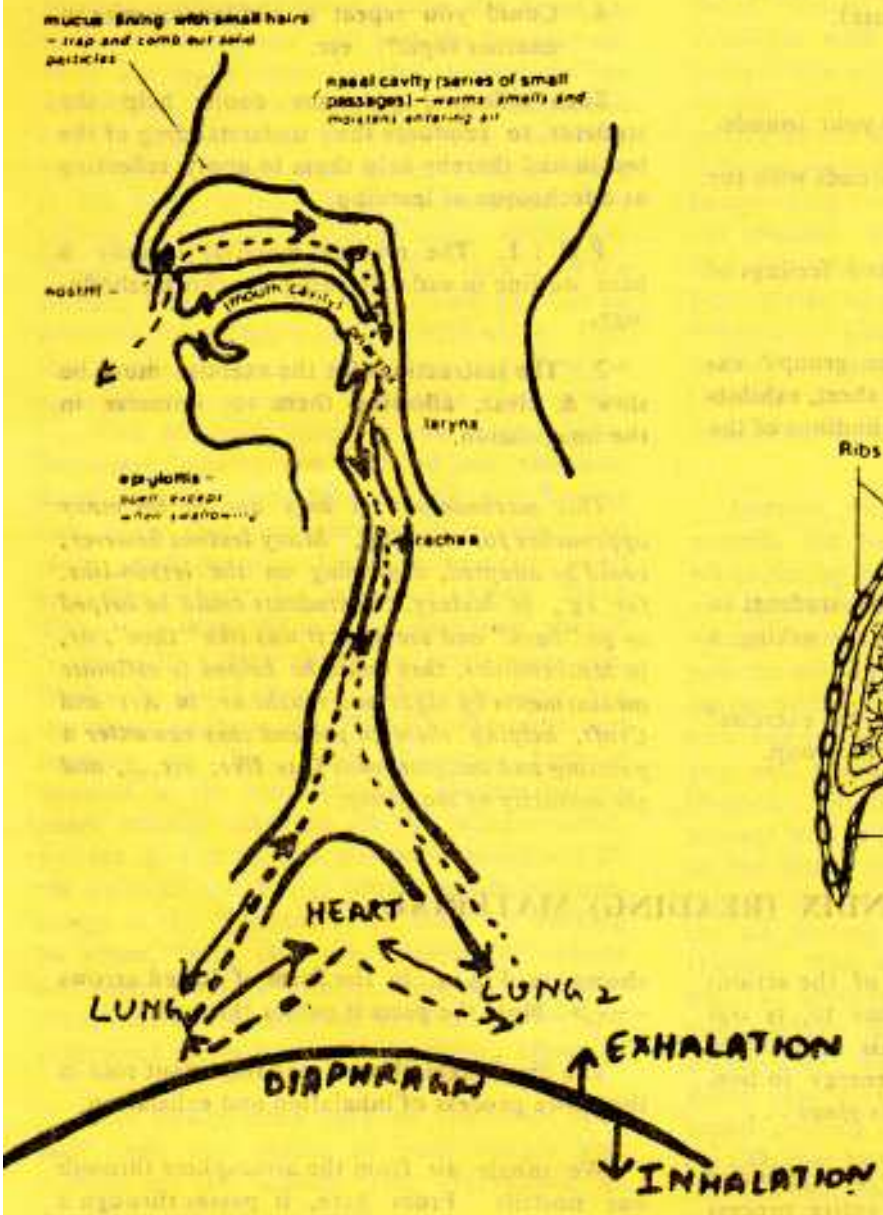
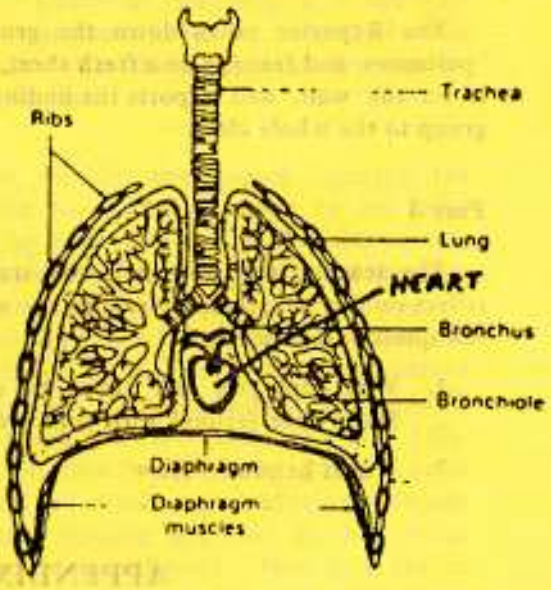


Fig. b



lungs through the bronchioles, which finally ends to form a number of air-sacs/alveoli. These air-sacs enable exchange of gases. From these the air enters the heart through the pulmonary blood-vessels. The heart plays a very important role in purifying the air that has entered; the blood that is being pumped by the heart all the time, consists of the carbohydrates. The oxygen present in the air combines with the carbohydrates to produce carbon-di-oxide, water and energy. The energy is not released all at once but in small amounts at various

(Continued on page 22)

INTEGRATION OF MATHEMATICS TO LIFE

One of the immense challenges we all face, as we are moving into the 21st century is the tremendous pace with which our world is changing. We are unable to keep pace with these changes. Under these circumstances, it is obvious that, this inability to keep pace is creating an imbalance and stress in our everyday coping strategies. If this is so, how are we, especially as educationists, with our inadequate coping skills, to lead our children to a harmonious and balanced future? How can we update ourselves to the changing world and help children to be able to identify and set life goals.

A new relationship can emerge now between educational institutions and the world in which these institutions are situated. Not only do we educators, must see ourselves as preparing students to fit into the world and to keep up with it, but also envision our children as effecting changes to make it better.

Here is an example of a Maths lesson to help us encounter routine and unexpected life circumstances by developing our personal competencies in life planning and our interpersonal compentencies in developing a caring social net work. Instead of teaching maths as a set of operations and manipulation of formulae, children can be helped to perceive how maths can be meaningful in their understanding of the world.

Subject area : Maths

Concept : Calculation of Area and volume

Objectives :

1. The students will be able to calculate the area and volume from a given house plan.
2. The students will be able to relate to the real living conditions of people from higher and lower socio-economic backgrounds.
3. They will be able to empathise with the deprived people in our society.

Methodology

1. The teacher divides the class into groups of four. In every group, one member is an *Organiser*—who collects the reading materials for the group, the working sheets, pencils and colours,

   One member is a *Reporter*—who reads out the problem,

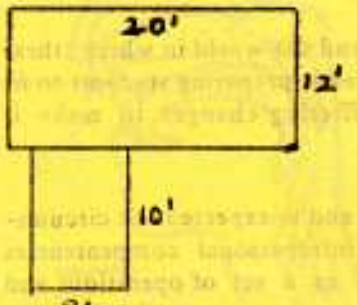
   One, a *Clarifier*—who seeks clarification, checks the solutions of each member of the group and sees how each one has arived at the solution and,

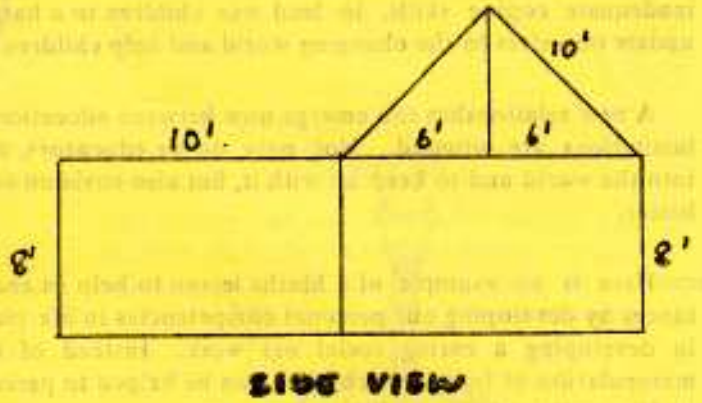
   One an *Encourager*—who keeps the group motivated to reach the solution together.
2. Every member of the group will answer all the questions individually.
3. The answer will be then discussed in the group.
4. The reporter will present the group findings to the class.

OVERCROWDED LIVING CONDITIONS (READING MATERIAL)

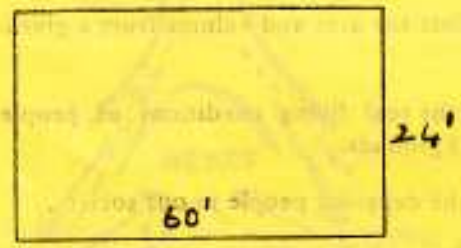
Many of us complain when we have to share a bathroom with other family members or, even worse, with overnight guests. But there are other Indians who are just glad to have a roof over their heads. Consider the Guttu family from Dharavi, Bombay. Their house is typical of many of the shacks, seen in the mountains. Mr. and Mrs. Guttu with their six children live in the house pictured below. N.B. The symbol ' means feet.

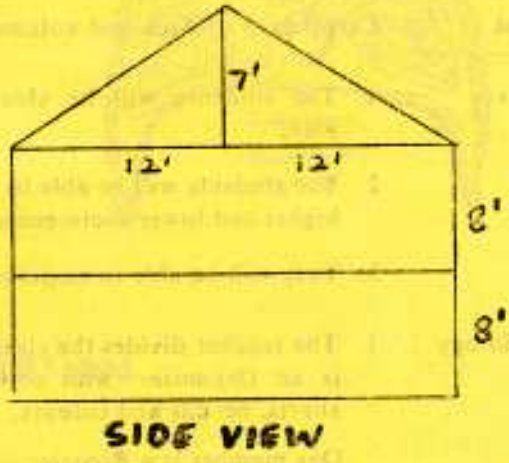
FLOOR PLAN





Now consider a typical Bandra House from a working-class neighborhood. Assume that a total of five people live in the house.





(Note: There are two floors with these dimensions.)

Please answer the following:

1. Find the area of Guttu's House in square feet.
2. Find the volume of the Guttu's House, including their attic, in cubic feet.
3. How much area is there per person in Guttu's House? How much volume per person?
4. Find the area of the Bandra House, its volume, the area per person and the volume per person?

5. Compare these two housing situations. In your opinion, do the Guttus live in adequate housing? Would you want to live in their house?

6. Measure the house or apartment you live in, calculate its area and its volume, and determine the area per person and the volume per person. Compare your house with the two described above and state whether or not it is more spacious.

FOR THE TEACHER

The Injustice :

Is it fair that many of us have to live in overcrowded conditions? While conditions in the villages can be deplorable, they are even worse in the interiors because they are unsafe as well as overcowded.

The Mathematics:

This problem fits well into a Geometry class for any level of student. However, it would be ideal if the teacher could modify as per the abilities of her group.

The student will be actively involved in measuring his or her own house. There will probably be interesting discussions on how to measure some houses.

This does not mean that every lesson in Maths has to bring out values. Wherever possible, it is the duty of the teacher to help the child see the world in its real perspective and leading to acquire appropriate value.

God says "I like little children because my image has not yet been dulled in them. I like youngsters because of the look in their eyes: there is nothing more beautiful than the pure eyes of a child and nothing sadder than lifeless eyes. The windows are open, but the house is empty; two eyes are there, but no light. Open all of you, little old men and women. It is I, your god, coming to bring back to life the child in you".

From Prayers, by MICHEL QUOIST.

(Contd. from page 3)

topic going on in the class for e g. If the topic is on animals, the child could be asked to share his experiences with some pets or other animals, or somethings about his experience in a zoo .....

In all these, the teachers comments/ suggestions/directions, have to be given with the appropriate tone of voice, expressions and gestures, for, the same positive words/vocabulary could convey a negative message, when used with inappropriate non-verbal cues/gestures. However, the same statement could be a humiliation to the child if accompanied by an authoritative and aggressive tone of voice.

You must have noticed that in your learning experience you liked a particular subject and you gave your best to it. Therefore you like 'that' thacher as a person and thus shared a good rapport with her. Therefore one important thing the teacher has to keep in mind is that the teachers' rapport/relationship with the class, as well as individual children in the class, is of paramount importance in any teaching learning situation especially in the correction of behaviour maladjustments.

So, it may be good to ignore such behaviours and not to make it an issue. Making an issue out of nothing could pave the way for the children to use this as a means to seek attention !!!!

An important thing for us to realise is that we teachers are not trying to change the child, but modify his behaviour to more appropriate and socially approved ones. Hence, we have to emphasise the behaviour which is to be changed, while accepting and loving the child unconditionally.

We can already see that there is NO universal, fool-proof formula for every teacher, for every child, and for every situation. Therefore, consider the above as an exploration and not as a recipe!

We'll be also happy if you could share similar experiences and issues with us Definitely, we'll, in our next issue, explore the possibilities of making shy, timid and withdrawn children to participate adequately in classroom interactions .....

(Continued from page 18)

stages; large amounts would not be tolerated by the cells. The carbon-di-oxide is not wanted by our cells, so it is pushed out of the system through the same passage the air entered, i e., from the heart to the alveoli through the pulmonary blood vessels, from the alveoli through the trachea, pharynx, larynx, and the nasal cavity out in the atmosphere.

Thus the passage of oxygen is nostrils-mucus lining pharynx-larynx-bronchus-bronchioles-alveoli (air-sacs)-pulmonary blood vesselsheart.

In the heart, carbohydrates + Oxygen = Carbon-di-oxide + water + energy.

The carbon-di-oxide passes, from the heart—pulmonary blood vessels—nasal cavity—nostrils —out.

The diaphragm plays a very important part in this entire mechanism, i e. for the air to enter inside, it pushes itself (contracts), to allow space for the CO_2 to be released, the diaphragm expands so that there is no space in. (Fig a, shows the expansion and contraction of the diaphragm as arrows.)

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